SRH SSD 2006-2
2/2006

Technical Attachment

Operational Practices During the January 12, 2006 Wildfires and Frontal Passage in West Texas

Todd Lindley, Jody James, Kenneth Widelski, Gary Skwira,
Stephen Latimer, Brian LaMarre, and Steve Cobb
WFO Lubbock, Texas

1. Introduction

During a period of very dry and unseasonably warm weather within an intensifying short term drought, a series of damaging wildfires ignited over the southern Texas Panhandle and the west Texas South Plains on the afternoon of January 12, 2006. At least four large fires were ongoing when a strong cold front passed through the region affecting the active burn sites. The wind shift altered the direction of fire propagation, and caused one fire to threaten the town of Dimmitt, Texas in the extreme southern Texas Panhandle.

Sudden wind shifts, including the passage of cold fronts and outflow boundaries, pose a significant danger to those engaged in battling wildfires. Such instances have been known to alter fire propagation unexpectedly and result in serious injuries to fire fighters, the loss of fire fighting equipment, and threaten structures previously not in the fire's path.

A combination of threat-specific graphical and text forecasts and warnings along with pro-active communication with partnering agencies allowed WFO Lubbock to provide local officials with key information to aid in coordinating safe fire fighting strategies. Forecasters' situational awareness was also enhanced through the use of various remote sensing and *in situ* weather equipment such as surface mesonet observations, radar, and satellite imagery. This paper will provide a timely review of operations at WFO Lubbock during this high-impact fire weather situation. Given the ongoing drought conditions and high fire danger across the Southern Plains, this review will highlight best practices used during the event.

2. Case Overview

A shortwave trough dug southeastward through the Rockies into the Central U.S. on January 12, 2006 (Figure 1a). In advance of the storm system, cyclogenesis over the Southern Plains increased pressure gradients south of an advancing cold front. Strong westerly pre-frontal winds helped to spread very dry air with dewpoints in the single digits over areas experiencing intense drought conditions (Figure 1b). The combination of very low humidities, strong winds and dry fuels led to an extremely critical fire weather situation over the South Plains of west Texas (Figure 2).

With the cold front forecast to bring an abrupt northerly wind shift to the South Plains during the afternoon hours, forecasters recognized the potential for a wildfire/wind shift interaction that could complicate ongoing fire fighting efforts. This case illustrates the ability to enhance collaboration and services during high-impact events, and underscores the importance of fostering relationships between field offices and local officials in support of the NWS mission. As fires ignited during Red Flag conditions over the extreme southwestern Texas Panhandle and the South Plains, critical short term forecast information on the wind shift was quickly relayed to local fire fighters, emergency managers, and the local media.

3. Best Practice – Headline Fire Weather Products Appropriately

Highlighting wind shifts in fire weather products can significantly raise awareness for fire weather planners. Specific details included in the discussion section of the fire weather planning forecast can alert local fire fighters and emergency managers to potential small scale hazards that may affect fire fighting strategies.

Headlining potential wind shift information in the Fire Weather Planning Forecast (FWF) can serve as an extended utility for local fire weather customers. The advanced warning of a wind shift and its potential effects can allow fire weather planners to better manage resources, maintain situational awareness in the field, and anticipate changes in fire conditions.

Once the timing and impact of the front became certain, the following updated FWF was issued during the morning hours on the 12th. Notice the headline for a wind shift and the corresponding impact on fire propagation. This update served to provide excellent notice of a potential threat. In addition to the headline, a discussion further highlighted the potential impacts of a strong northerly wind shift at burn sites.

FIRE WEATHER PLANNING FORECAST FOR THE SOUTH PLAINS AREA...UPDATED
NATIONAL WEATHER SERVICE LUBBOCK TX
948 AM CST THU JAN 12 2006

...RED FLAG WARNING IN EFFECT FROM 10 AM THIS MORNING TO 6 PM CST THIS AFTERNOON FOR THE EXTREME SOUTHERN PANHANDLE...SOUTH PLAINS AND ROLLING PLAINS FOR RELATIVE HUMIDITIES OF 15 PERCENT OR LESS... SUSTAINED 20 FOOT WINDS OF 20 MPH OR GREATER AND EXTREMELY HIGH FIRE DANGER...

...NORTHERLY WIND SHIFT TO AFFECT FIRE PROPAGATION THIS AFTERNOON...

.DISCUSSION...
AN UPPER LEVEL DISTURBANCE MOVING INTO THE PLAINS TODAY WILL DRIVE A COLD FRONT INTO THE PANHANDLE THIS AFTERNOON AND INTO THE SOUTH PLAINS REGION DURING THE EARLY EVENING. AHEAD OF THE FRONT...A TIGHT SURFACE PRESSURE GRADIENT WILL DEVELOP PRODUCING SUSTAINED 20 FOOT WINDS OF 20 TO 25 MPH AND WILL OVERSPREAD THE AREA BY MIDDAY. GIVEN THE EXTREMELY DRY AIRMASS OVER THE OUTLOOK AREA AND PRIMED FUEL

MOISTURES... THERE WILL BE A HIGH THREAT FOR WILDFIRES GIVEN ACCIDENTAL IGNITION. A HIGH HAINES INDEX TODAY WILL CONTRIBUTE TO EXPLOSIVE FIRE GROWTH POTENTIAL.

THE COLD FRONT WILL SINK SOUTH INTO THE EXTREME SOUTHERN PANHANDLE AND THE NORTHERN SOUTH PLAINS BY LATE AFTERNOON. THIS WILL RESULT IN A STRONG NORTHERLY WIND SHIFT THAT COULD AFFECT THE PROPAGATION OF ANY ONGOING FIRES.

4. Best Practice – Communicate Information Via Graphical Forecasts

Graphical products can be a critical tool in communication with emergency managers and the general public. The Graphicast images produced with the FX-Collaborate (FXC) software (Grote, 2002) at many NWS offices quickly communicate large amounts of information *(a picture is worth a thousand words)*, in a manner that can be easily understood by a wide range of users. The response by most NWS customers and partners to graphical forecast products has been very positive. A forecaster can communicate the primary elements that are contributing to the critical weather situation, and highlight those areas most likely to be affected. WFO Lubbock produced a Graphicast depicting the extremely critical fire weather conditions and the anticipated afternoon frontal position during the morning of the 12th (Figure 3). The product was linked to an icon on the front of the WFO's Web page highlighting the ongoing wildfire threat. A local decision maker stated, *"This type of graphical product would enhance awareness as to which areas are the 'hot spots' to focus resources."*

5. Best Practice -- WFO Collaboration:

Maintaining a high-level of situational awareness is a key factor in providing the exceptional services demanded by NWS customers and partners. Shortly after 1800 UTC on the 12th, wildfires were ongoing in WFO Amarillo's county warning area (CWA) both behind and ahead of the cold front (Figure 4). In an effort to enhance situational awareness and collaboration, internally and externally, WFO Lubbock phoned the forecast team at WFO Amarillo to coordinate pro-active communications with local emergency response officials as new smoke plumes were identified in WSR-88D reflectivity imagery near the WFO Lubbock/Amarillo CWA border. The coordination allowed for the sharing of successful strategies employed during the ongoing operations so that the best possible services could be provided.

6. Best Practice -- Monitor Wildfire Activity and Provide Pro-Active Customer Briefings:

By 1855 UTC radar and satellite data depicted smoke plumes and hotspots developing across Hale County. The Hale County Sheriff's Office was called to verify the location of these fires. Information was exchanged and the sheriff's office was briefed on the approaching front and its potential impact on fire behavior and spread. One of the initial fires threatened structures, including a church, in the city of Plainview, but these fires were extinguished before the front passed. Over the next four hours, however, other fires

were detected via radar and satellite data, and through communication with local emergency officials in Castro, Hale, and Motley Counties. The below examples illustrate how these fires were identified and the pro-active measures taken to heighten awareness of the impending wind shift:

A wildfire near Dimmitt was initially identified in radar and satellite imagery at 2030 UTC by NWS and Texas Tech West Texas Mesonet personnel (Figure 5). Pro-active calls to the Castro County Sherriff's Office confirmed that the fire was burning out of control immediately north of Dimmitt. Over the next half hour the dispatcher was briefed three times by NWS personnel on the expected wind shift. By 2110 UTC the front interacted with the fire, shifting its propagation southward toward the city and burning three abandoned structures on the edge of town. Fire fighting resources, including two Texas Forest Service (TFS) air tankers were deployed and helped to prevent the flames from spreading into the city.

Another fire that burned one abandoned structure near Matador was reported to NWS Lubbock by the Motley County Fire Department Chief at 2105 UTC. Although evidence of this fire was not apparent in radar or satellite imagery, the chief was briefed three times during the next hour on the current position of the approaching front using radar and West Texas Mesonet surface observations. Detailed information regarding the expected time of wind shift, and relative humidity forecasts were relayed.

A fourth large fire was initially detected as a radar smoke plume near Hale Center (Hale County) just before 2200 UTC. A call to the Hale Center Assistant Fire Chief confirmed the wildfire just east of Hale Center. NWS personnel briefed the chief on prevailing and forecasted winds and relative humidity through the short term, and on the approaching front. This fire remained over open rangeland and presented no threat to the nearby city.

7. Best Practice – Utilization of Instant Messaging:

Similar to other high-impact operations, this wildfire event afforded yet another opportunity to collaborate with partners of WFO Lubbock services via Instant Messaging (IM). The IM service continues to be a highly innovative and appreciated tool in the provision of services to customers and partners, and was a critical link in the process of pro-active communications during this event.

Direct IM communication with WFO Lubbock's Regional Liaison Officer (RLO) for emergency management and local media affiliates allowed for a continuous two-way flow of information. After identifying smoke plumes and hot spots for wildfire locations, specific information was communicated to ensure local officials were kept abreast of the rapidly changing fire growth and propagation pattern associated with the approaching wind shift. Through IM coordination efforts with the RLO, the resources of state agencies such as the Texas Department of Public Safety and the TFS were allocated to the affected areas. As previously mentioned, IM communication between the WFO and the RLO assisted in the TFS efforts to provide air support for fire crews battling the Dimmitt fire, successfully containing the fire before it threatened the city. IM collaboration with media

partners also enabled them to dispatch crews to the impacted areas and allowed them to conduct live public-safety oriented broadcasts.

8. Best Practice – Enhanced Event-driven Products:

While monitoring satellite, radar, and West Texas Mesonet data, forecaster issued segmented short-term forecasts (NOWs) for the affected areas. The NOWs were issued hourly between 1830 and 2230 UTC and contained the following information:

- Strong winds, very low relative humidity, and warm temperatures creating an environment favorable for very high fire danger
- Abrupt wind shift from the west to the north associated with a frontal passage
- Cautions for drivers of high profile vehicles and localized reduced visibility due to blowing dust and smoke
- The Red Flag Warning and Wind Advisory were highlighted

The 1930 UTC NOW issuance, included a detailed wind forecast for Hale County in light of the numerous fires burning there. This provided specific timing information regarding the front/wind shift that was expected to pass burn sites near Plainview around 2130 UTC.

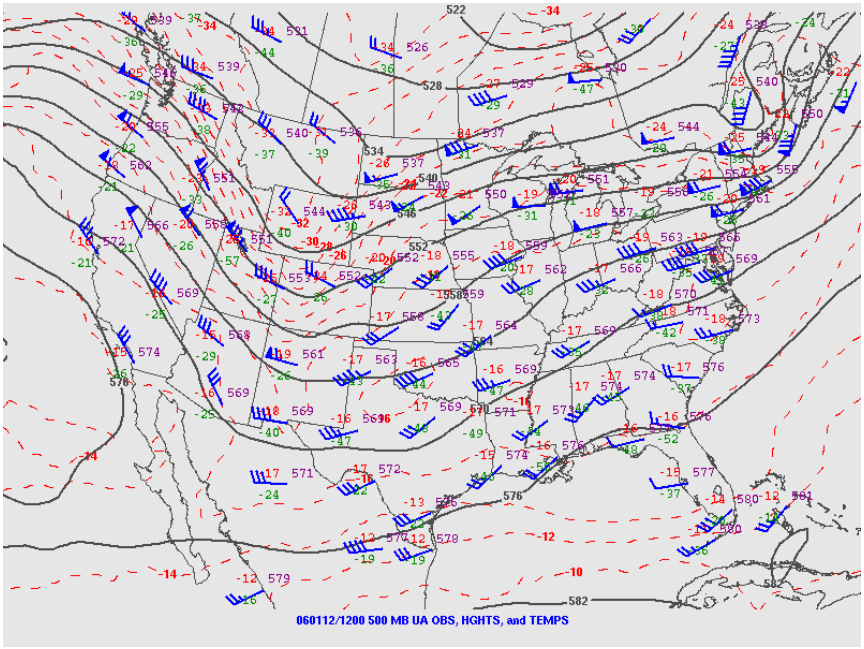
9. Summary

On the afternoon of January 12, 2006 during an intense short term drought, conditions came together for extreme wild fire activity across the South Plains of west Texas. Infusing new technology and identifying opportunities to enhance collaboration with both internal and external partners, WFO Lubbock was able to provide enhanced services during this high impact event. Several best practices were showcased or implemented and included: local wind shift expectations in fire weather forecasts and warnings; the use of remote sensing and in-situ equipment to monitor changing weather conditions; proactive communications with emergency management and media partners utilizing Instant Messaging software; the use of graphical forecasts to emphasize the threat and highlight specific impact areas to be impacted and enhanced event-driven products providing updates and appropriate call-to-action statements to the public. The implementation of leading edge and localized services during this event further supports the evolving need of WFO customers and partners. The best practices outlined may serve as a foundation for other offices to build upon in the provision and overall delivery of services for the diverse, local and high impact events across the entire NWS.

Reference

Grote, U. H., and C. Golden, 2002: Extending AWIPS to Support Remote Collaboration. Preprints, *18th Interactive Symposium on the Advanced Weather Interactive Processing System (AWIPS)*, Orlando, FL, Amer. Meteor. Soc., 114-117.

a)



b)

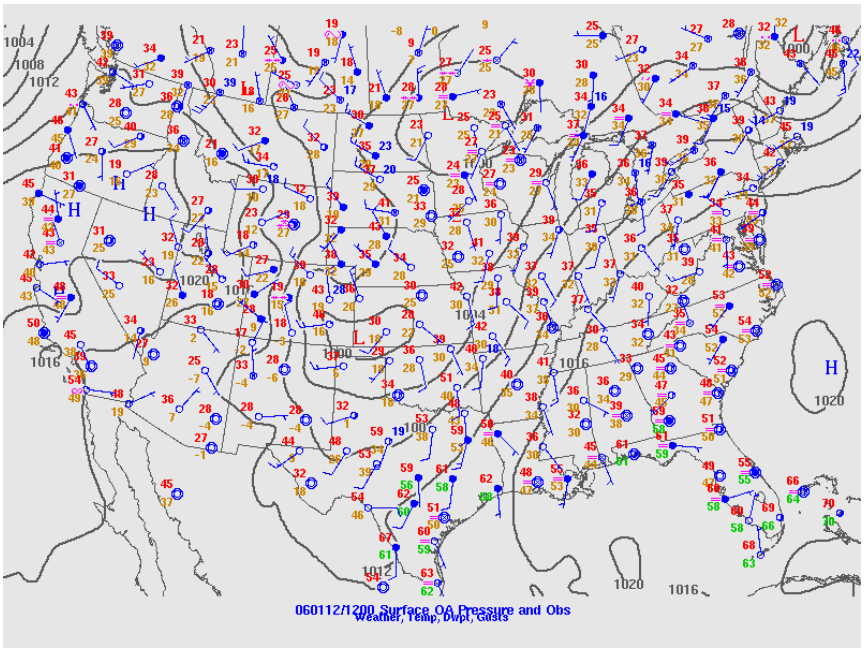


Figure 1 Objectively analyzed maps for 12 January 2006 1200 UTC at a) 500 mb b) surface.

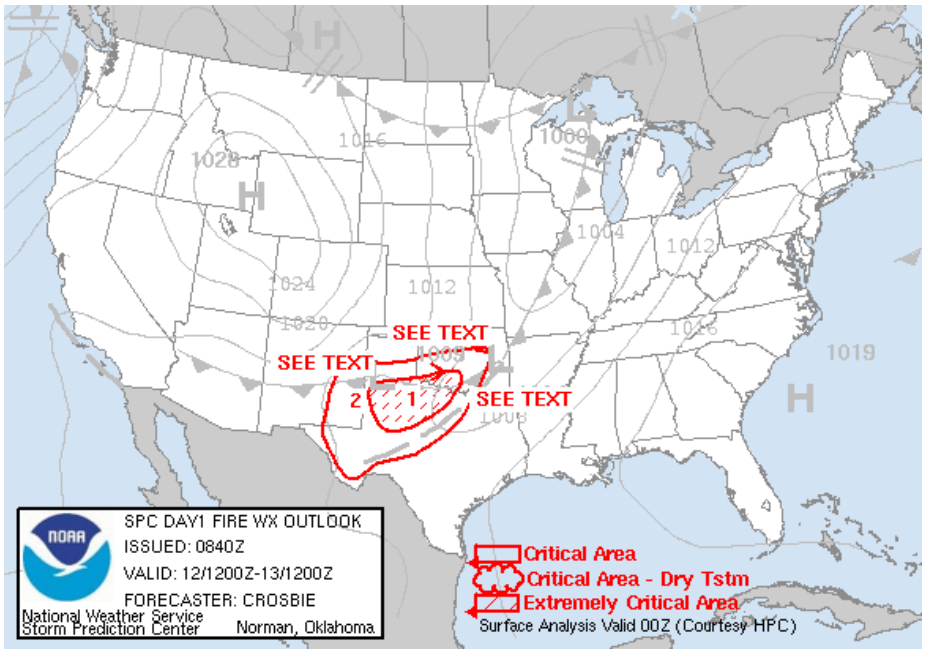


Figure 2 Map showing the SPC fire weather outlook product issued at 0840 UTC 12 January 2006.

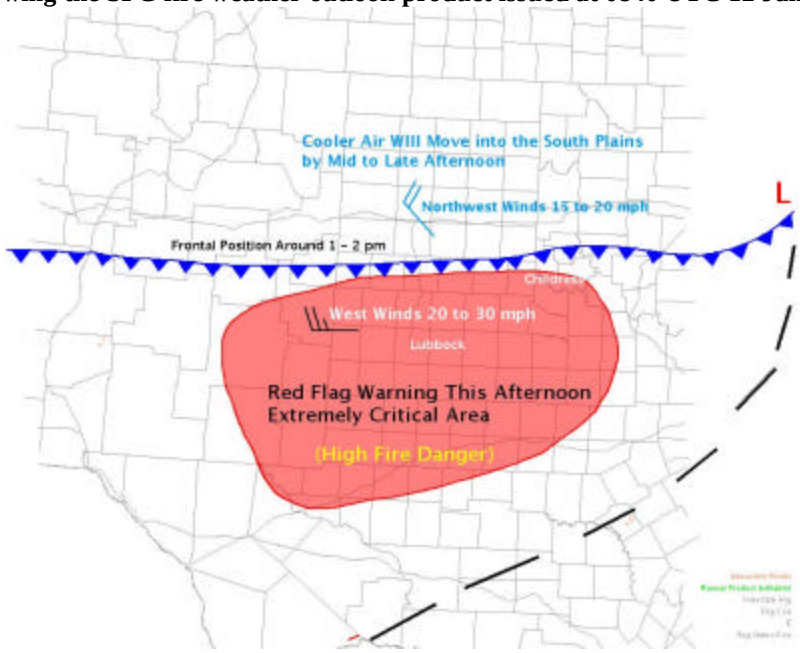


Figure 3 Graphical forecast issued by WFO Lubbock highlighting afternoon frontal position and area of enhanced wildfire threat on 12 January 2006.

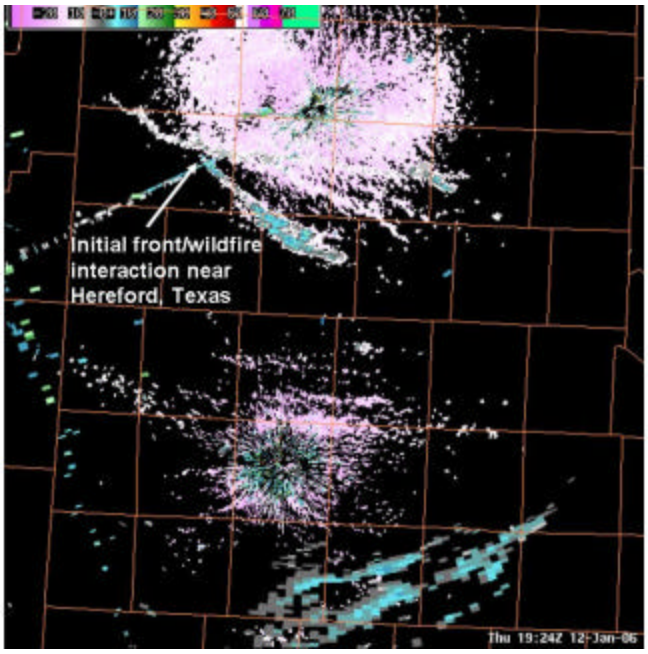


Figure 4 WSR-88D depiction of frontal boundary and wild fire interaction in the Texas Panhandle at 1924 UTC 12 January 2006.

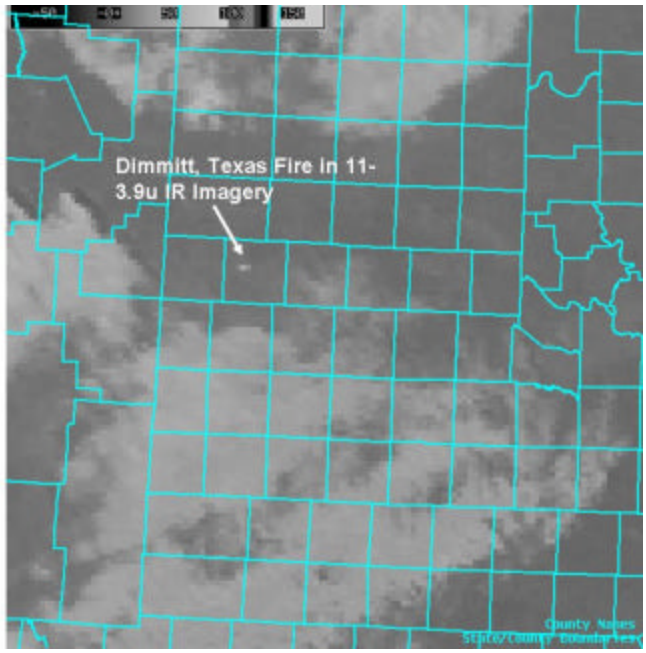


Figure 5 Infrared satellite imagery at 2031 UTC 12 January 2006.